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Wildland Fire Primer

A Guide for Educators

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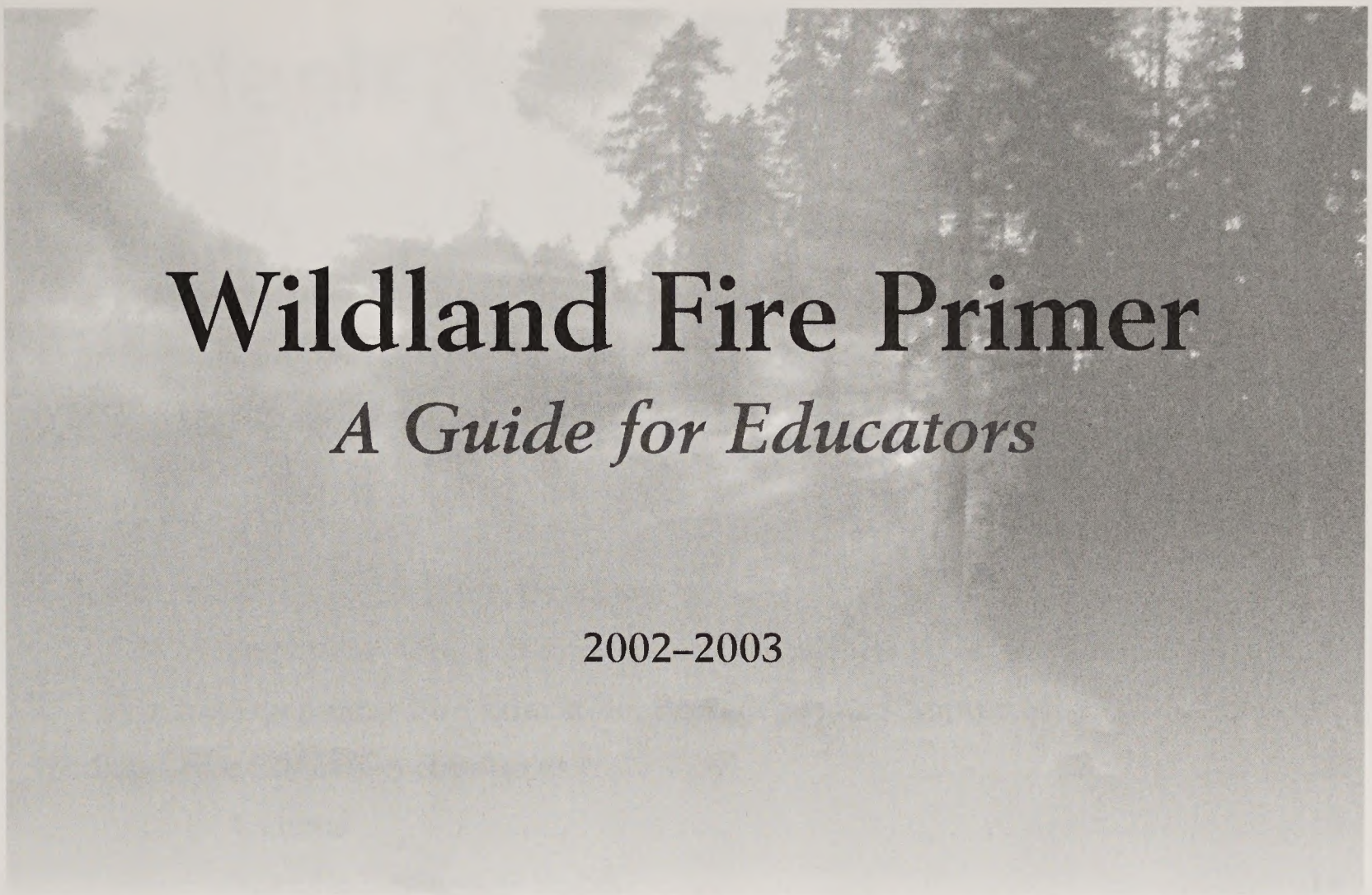

Wildland Fire Primer

A Guide for Educators

2002–2003

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Wildland Fire Primer

Introduction

This Wildland Fire Primer is intended to serve as an outline for educators interested in teaching students about wildland fire. Fire and its management can be intimidating subjects for those with little or no knowledge of wildland fire issues. The background information provided in this Primer and related curriculum materials will enable educators to feel comfortable discussing wildland fire topics, and assist them in bringing these important topics into the classroom.

It is not practical to include everything educators might need or want to know about wildland fire education in this Primer. Educators should contact local offices of Federal and State fire or resource agencies and local fire departments to get specific information about wildland fire education, policies, and effects in their area.

This Primer has five areas of emphasis: (1) the natural role of fire; (2) the historical and cultural aspects of fire; (3) the wildland–urban interface zone; (4) fire management—fuels treatment and prescribed fire; and (5) fire management—fire education, prevention, and suppression. Many fire topics blend into more than one area.

Included is a list of wildland fire education resource materials and fire-related Web sites. Some materials may be available through local offices of Federal or State agencies, while others are available through various additional outlets.

I. The Natural Role of Fire

Important concepts:

1. Fire is a dangerous and powerful force.
2. Wildland fire is a natural process. (Wildlands are areas with very little or no development.)
3. Three elements are needed to sustain fire—heat, oxygen, and fuel.
4. Fire plays an essential role in many ecosystems.
5. Many times, recurring fires are necessary to maintain healthy ecosystems.

- Fire can occur in a number of settings: for example, a house going up in flames or a forest fire burning through trees.
- Fire can be a prescribed burn. This is a fire carefully planned and managed by professionals to benefit the ecosystem and reduce the risk of wildland fire.
- Fire is a part of natural systems, just as precipitation and wind are.
- Plants contain nutrients that are recycled into the soil by fire.
- Wildlands have been changed and shaped by natural fires for thousands of years.

- Fire is a chemical reaction requiring **heat, fuel, and oxygen**—the fire triangle.
- The **heat** source for a fire can be a match, a spark from a machine, or a lightning strike.
- **Fuel** for a fire can be anything that will burn—grass, trees, or houses.
- **Oxygen** is found in the air around us.
- A fire can start when all three of these elements—heat, fuel, and oxygen—are present.

- Some plants and animals need periodic fires for survival. **The absence of fire, or the occurrence of extremely intense fires, can alter or damage ecosystems.**

- In the tallgrass prairies of the Midwest, periodic fires can reduce the number of trees and shrubs and increase the growth of important native grass species like big bluestem and Indian grass.

- In the southern pine forests, fires can reduce undergrowth and competition from other plants. This allows the pines to increase in size and be used by cavity nesters such as woodpeckers.

- Aspen stands need fire to regenerate. In the Intermountain region, active fire suppression (coupled with the associated invasion of other species) has reduced aspen stands to approximately 50 percent of what they were 100 years ago.

- Either wildland fire or the absence of fire can change the composition of plant communities. Because different food sources are available under different fire cycles (i.e., the length of time between fires in a given area), small mammal populations can change. This, in turn, can impact predators and other species in the food chain.

II. The Historical and Cultural Aspects of Fire

Important concepts:

1. Native Americans used fire as a tool.
2. In the United States, as civilization developed, the use of fire decreased.
3. In the 1800s, wildfires burned large areas of the country, as well as some cities.
4. In the early 1900s, wildland fire suppression activities were organized.
5. The Smokey Bear campaign emphasizes the prevention of unwanted ignitions.
6. Learning to live with fire requires a comprehensive view of fire.

- Native Americans used fire for many reasons. Along the east coast, tribes practiced "slash and burn" agriculture—burning to clear the land for crops and then moving to a new area a few years later. The Shenandoah Valley was maintained as a grassland by burning, and both elk and buffalo lived there in the 1700s. Native Americans used fire to make travel easier, improve hunting, harvest berries and seeds, clear ground for cultivating crops, increase the availability of plants used for medicinal purposes and basket making, and keep prairies and meadows open and free from trees.

- When European settlers came to America, the country had already been shaped by the practices of Native Americans, including the use of fire. Early pioneers and settlers used fire much as Native Americans did. However, with the increase in the size and number of communities, fire became more of a threat and less of a tool for managing land.

- Occasionally, large fires would occur in forest and timber areas. Maine, Michigan, Wisconsin, and the Northwest saw large fires occur as more people moved into these areas. A drought and severe weather conditions contributed to the great Chicago fire and the Peshtigo, Wisconsin, fire, both of which occurred in 1871.

- The passage of laws that created public lands (1891, 1897), the establishment of the USDA Forest Service, and the occurrence of other large fires such as the famous 1910 forest fires in Idaho and Montana led to a larger and more active fire suppression effort.

- **A national fire prevention campaign** signaled a new emphasis in fire prevention. This program was begun during World War II to reduce human-caused fires, and Smokey Bear soon became its popular icon.

- **Learning to live with fire goes beyond fire prevention.** It means understanding the role of fire in ecosystems; that fires are sometimes necessary; that firefighters cannot suppress all fires immediately; that some fires should be "managed" rather than suppressed; that individuals can take steps to protect their families, homes, pets, and other structures from wildland fires; and that **we must live "carefully and compatibly" in fire-prone areas.**

III. The Wildland–Urban Interface Zone

Important concepts:

1. The wildland–urban interface is more than a geographic area. It is anywhere homes exist among flammable vegetative fuels.
2. Because wildland fire is an essential component of healthy ecosystems, people need to live compatibly with wildland fire.
3. Communities and wildland fire managers need to work as partners to protect communities from wildfire while maintaining healthy ecosystems.
4. Firewise practices increase the likelihood that homes, office buildings, and other community resources (watersheds, infrastructure such as roads or communication lines, and other resources) will survive wildland fire damage.

- Three elements that are present in the **wildland–urban interface zone** are: (1) **wildland fuels** (trees and shrubs), (2) **urban fuels** (homes and landscape plants), and (3) **limited fire protection resources**. In short, this zone is "where the leaves meet the eaves." The zone can be a house in the woodlands, a subdivision on the edge of a community, or a home with a combustible roof surrounded by large amounts of landscape vegetation.

- As people move into areas where fire plays a role, homes become a possible fuel source and the potential for human-caused ignitions increases.

- **Firefighters can't do it alone!** Communities need to balance the needs and values of both people and natural resources by taking action before fires start.

- Firewise practices can provide a survivable space for homes and communities. Residents should (1) use fire-resistant building materials, especially on the roof; (2) remove flammable materials from around homes; (3) create fire breaks with lawns, driveways, and walkways; (4) install screens on chimneys and burn barrels; (5) stack firewood away from homes; (6) provide appropriate space between plants and remove lower branches from trees; and (7) make sure the home address is visible from the street.

- Homes don't have to burn! Work done around a home before a fire starts can save property and lives. **Homeowners and communities, working as partners with firefighters, can effectively reduce losses caused by wildland fires.**

IV. Fire Management—Fuels Treatment and Prescribed Fires

Important concepts:

1. Wildland fire suppression is not always the objective of fire management.
2. Managing wildland fires requires balancing safety, costs, and the protection of property and resources.
3. Prescribed fire (a fire intentionally set by professionals) is an important tool for managing wildland ecosystems and fire risk.
4. Postfire practices and rehabilitation projects are important to communities and ecosystems.

- **Fire suppression** is an effort to put out the fire. **Fire management** may include fire suppression but also uses fire prevention and fuels treatment, including prescribed fire, research, and monitoring, to protect communities and provide for healthy ecosystems.

- Fire management involves balancing public safety, firefighter safety, fire management costs, the protection of communities and property, and the protection and maintenance of ecosystems.

- One of the results of the long history (approximately 100 years) of wildland fire suppression has been the buildup of the amount of vegetative material available for fires to burn. This material is called fuel. Because of the fuels buildup, fires can burn unnaturally hot, damaging the soil and the ecosystems.

- Four methods of controlling the amount of fuel in an area are: (1) **mechanical treatment,** (2) **biological treatment,** (3) **chemical treatment,** and (4) **prescribed burning.** Mechanical treatments involve cutting or chipping material and removing it from a site. Biological treatments rely on the consumption of plants by animals. An example would be having cows or goats graze in an area. The use of herbicides is an example of chemical treatment. Sometimes fire managers will use fire to reduce fuels and maintain the ecosystem's wildland fire regime. To do this, they will either use prescribed burns or manage naturally occurring fires. Both of these options are used within strict guidelines.

- Prescribed fires are carefully planned to burn under the right conditions (fuel moisture, temperature, humidity, season, and wind) to produce the desired results (such as reducing fuel, removing unwanted plant species, or stimulating new growth).

- Because even the best-planned prescribed fires can escape. fire managers must balance the risk of prescribed fire with the possible effects of a potential wildland fire that could have severe impacts in the same area.

- Prescribed fires can reduce the impacts of larger, more damaging, and more difficult to control wildland fires.
- Sometimes a combination of fuels treatment methods is required.
- After a wildland fire or prescribed burn, fire managers and others work to restore the impacted ecosystems by planting and seeding the burned areas.

V. Fire Management—Fire Education, Prevention, and Suppression

Important concepts:

1. Wildland fire suppression dates back over 100 years, with mixed results.
2. One of the consequences of past fire management practices has been an unnatural buildup of fuels in many ecosystems.
3. There are many careers in natural resources that relate to fire management
4. Fire education and fire prevention play important roles in fire management.

- For the past 100 years, fire managers have suppressed an average of 98 percent of all fires in the first or "initial attack" phase.

- Over time, these suppression efforts have caused an unnatural buildup of volatile fuels, including ladder fuels. **Ladder fuels provide a pathway for fire to move from ground level up to shrubs and, ultimately, up to treetops that otherwise would have been safe from ground fires.**

- Today, fires that escape containment may become more intense because of high fuel loads, causing more damage to property and ecosystems.

- These severe fires require more effort to contain, increase risks to life and property, and have higher costs in terms of management and rehabilitation.

- Natural resource agencies continue to suppress fires in many cases, but they also plan for other fire management options.

- Even though resource managers have learned the importance of fire in natural systems and the benefits that fire can have, preventing unwanted fires and having an effective firefighting force are still very important tools for fire managers.

- Wildland fire managers use many different types of firefighting equipment and resources: hand crews, bulldozers, smokejumpers, dispatchers, helicopters, and air tankers. Each of these has a specific role in fire suppression and management. Some of the considerations for fire managers in using these resources are safety of use, costs, and environmental impacts.

- There are several career paths in natural resources that relate to fire management. Technical fire suppression specialists start on hand crews or engine crews and may ultimately become fire supervisors. Other groups that may be involved with fire management include fire prevention/education specialists, meteorologists, communications specialists (radio and computer), business operations staff (those involved in finance/payroll, procurement, and contract management), biologists, fire ecologists, and range/forestry specialists.

- Fire safety and fire prevention programs use proactive methods to reduce the number of unwanted human-caused fires and mitigate loss and damage to communities and wildlands from unpreventable fires. Topics covered in these programs include personal and community safety, the responsible use of fire (e.g., debris burning, campfires, and fireworks), and fire mitigation principles.

Wildland Fire Education Resources

Listed below are some wildland fire education resources available to educators. Many of these resources may be available through the local fire education and prevention offices of Federal wildland agencies (USDA Forest Service, National Park Service, Bureau of Land Management, Bureau of Indian Affairs, and U.S. Fish and Wildlife Service).

General

Burning Issues (grades 5–10). U.S. Department of the Interior, Bureau of Land Management, and Florida State University. This CD-ROM offers interactive multimedia lessons on fire ecology and fire management, including fire management simulations. The CD also contains the student and teacher educational guides (*http://fsu.edu/~imsp*).

Fire Ecology Resource Management Education Unit (grades 4–8). Interagency Fire Education Initiative. Ecology Communications Lab, School of Natural Resources, Ohio State University. This unit contains activities developed to help students become better informed about fire and land management issues, as well as background information on fire ecology. It is available on the Web (*http://fire.nifc.nps.gov/fire/ecology/docs/toc.html*).

Fire Education Team Publications and Materials. U.S. Department of the Interior, U.S. Department of Agriculture, and National Association of State Foresters (*www.symbols.gov/catalog/products/fire*):

Bert's Back Pack (Pre-K–3)
Students can take Bert the Buffalo home and go over the Fire Education Team materials with their parents.

Fire Education Team—Good Fire/Bad Fire Activity Kit (Pre-K–3)
The Fire Education Team is introduced in this folder, which contains good fire/bad fire cue cards, stickers, and activity sheets.

Fire Education Team Big Book (Pre-K–3)
Good fire/bad fire and many other fire education topics are covered in this large-format book.

Fire Education Team Activity Book (grades 2+)
This 17-page book includes coloring and other activities on fire-related topics.

The Fire Education Team Zip Game (grades 4+)
This game consists of 30 fire education question-and-answer cards. The front of each card has a question and an answer about fire education. The back of each card has an animal tip and a fire tip.

Project Learning Tree Fire Education Materials. (Pre-K–12). American Forest Foundation. PLT is an award-winning, interdisciplinary, environmental education program. PLT has materials on forest management and fire ecology (*www.plt.org*):

> ***Pre K–8 Environmental Education Activity Guide:***
> "Forest for the Trees," "Nothing Succeeds like Succession," "Living with Fire."
> ***The Changing Forest: Forest Ecology Secondary Module:***
> "Story of Success," "Understanding Fire," and "Fire Management."
> ***Exploring Environmental Issues: Focus on Risk Secondary Modules:***
> "Decision Making: Ecological Risk, Wildfires, and Natural Hazards."

Smokey Bear. A variety of Smokey Bear fire prevention materials is available from many wildland firefighting groups. Information is also available on the Smokey Bear Web site (*www.smokeybear.com*)

Specific Regions or States

Fire in Florida's Ecosystems Educator's Guide (grades 4–8). Division of Forestry, Florida Department of Agriculture and Consumer Services (*http://flame.fl-dof.com/FIFE*).

FireWorks Curriculum (grades 1–10). Jane K. Smith and Nancy E. McMurray. 2000. USDA Forest Service, Rocky Mountain Research Station, Fort Collins, CO. General Technical Report RMRS-GTR-65 (*www.fs.fed.us/rm/pubs/rmrs_gtr65.html*).

The Colorado Fire Box: Activities for Understanding Wildland Fire (grades 6–12 and adults). Greater Arkansas River Nature Association, P.O. Box 1522, Salida, CO 81202, (719) 539-5106, *info@garna.com*.

Wildfire Classroom Activities: Fire Prevention Curriculum for Grades K–3. 1999. Olympia, WA. Washington State Department of Natural Resources, Fire Prevention/Fire Education Program (*www.wa.gov/dnr/htdocs/rp/prevention/k3.htm*).

Web Sites

There are many sites that contain fire ecology and wildland-fire-related information. Those listed here provide a good source of basic information and also have links to a number of other sites.

www.firewise.org - National Wildland/Urban Interface Fire Program

www.fire.blm.gov - Bureau of Land Management Fire and Aviation

www.nps.gov/fire - Fire in the Parks, National Park Service

www.fs.fed.us/fire - USDA Forest Service Fire Management

www.fs.fed.us/database/feis - Fire Effects Information

www.nifc.gov - National Interagency Fire Center

www.nwcg.gov - National Wildfire Coordinating Group

www.plt.org - Project Learning Tree

www.blm.gov/education - Bureau of Land Management Education Resources

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